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DISPOSAL OF HYDROGEN CYANIDE AT TOOELE ARMY DEPOT, UTAH.(U)
JUL 78 R L HANSON
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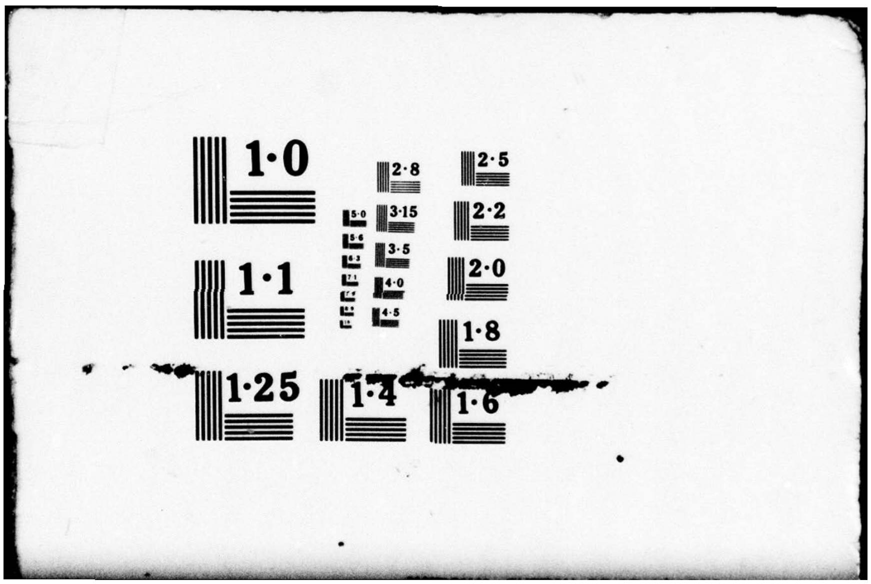
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AN-M79 Chemical Agent Bomb	Incineration	Avian Species
Rush and Tooele Valleys	Disposal	Air Quality

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report Provides description of proposed action to detoxify 281 lbs of HCN stored at Tooele Army Depot. Environmental effects are analyzed and safety/environmental control aspects described.

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DEPARTMENT OF THE ARMY
OFFICE OF THE PROJECT MANAGER FOR
CHEMICAL DEMILITARIZATION AND INSTALLATION RESTORATION
ABERDEEN PROVING GROUND, MARYLAND 21010

DISPOSAL OF HYDROGEN CYANIDE AT TOOELE ARMY DEPOT, UTAH

FINAL ENVIRONMENTAL IMPACT STATEMENT

JULY 1978

PREPARED BY:

ROBERT L. HANSON
LTC, MSC
Office of the Project Manager
for Chemical Demilitarization
and Installation Restoration

CONCURRING:

PETER G. BURBULES
Colonel, OrdC
Commander
Tooele Army Depot

APPROVED BY:

FRANK A. JONES, JR.
Colonel, CmlC
Project Manager for
Chemical Demilitarization
and Installation Restoration

SUMMARY SHEET

DISPOSAL OF HYDROGEN CYANIDE AT TOOELE ARMY DEPOT, UTAH

( ) Draft (X) Final Environmental Impact Statement

Contact for additional information:
Office of the DA Project Manager for
Chemical Demilitarization and
Installation Restoration
Building E-4585
ATTN: DRCPM-DRD-OM (Mr. Edward A. Coale)
Aberdeen Proving Ground, MD 21010
Commercial Telephone: (301) 671-2054
Autovon: 584-2054

Responsible Office: Office of the DA Project Manager for Chemical Demilitarization and Installation Restoration, Aberdeen Proving Ground, MD 21010

1. Name of Action: (x) Administrative ( ) Legislative

2. The proposed action consists of detoxifying 281 pounds of the chemical agent hydrogen cyanide which is stored in two bombs at Tooele Army Depot, Utah. The bombs are not explosively configured. The two bombs will be moved from their storage location to an existing incinerator facility where the hydrogen cyanide will be removed by pressurization of the bombs with nitrogen and introduced via a feed/control system into the incinerator which will be operated at a temperature of 1100°F. Effluent gases from the incinerator will pass through an afterburner operated at 1500°F and discharged into the atmosphere. The combustion by-products will include carbon dioxide, water vapor, nitrogen, and nitrogen oxides. Hydrogen cyanide emissions during the two-day operation will be maintained below 0.028 pounds per minute to insure, even under the worse meteorological conditions, a maximum ground level concentration of 1/30 the TLV® will not be exceeded. The drained bombs will be chemically and thermally decontaminated prior to disposal as scrap metal. The chemical decontaminating solution will be drum dried to form a dry sodium salt by-product which will be placed in a 55-gallon drum and disposed of by burial in a sanitary landfill.

3. This is not a major Federal action. The proposed action is not anticipated to have significant impact on man or his environment, nor is it anticipated that it will be environmentally controversial. This proposed action has been developed with safety, security, and protection of the environment as primary concerns.

4. Alternatives to the proposed action include continued retention, disposal at another demilitarization facility, and sale of the hydrogen cyanide.

5. Comments on the Draft Environmental Impact Statement were solicited from the below listed organizations. No written comments were received.

a. Department of Health, Education and Welfare.

b. Environmental Protection Agency:

(1) Office of Federal Activities.

(2) Region VIII.

c. State of Utah:

(1) State Planning Coordinator.

(2) Wasatch Front Regional Council.

d. Environmental Defense Fund.

6. The Draft Environmental Impact Statement was received by the Environmental Protection Agency on 12 May 1978, and was made available to the public on 19 May 1978.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SECTION 1. DESCRIPTION OF THE PROPOSED ACTION

A. Background.

1. Tooele Army Depot, Utah, is one of eight US Army installations in the United States with a military mission for storage of materiel which is in the chemical agent deterrent stockpile. Included in the materiel stored at Tooele Army Depot are two AN-M79 chemical agent bombs which contain 281 pounds of hydrogen cyanide (HCN). This is all that remains of the former HCN stockpile, the majority of which was destroyed in the late 1950's.

2. The two bombs (Figures 1 and 2) are stored in the toxic gas storage area which is located in the South Area of Tooele Army Depot. The bombs are in good physical condition, are not fuzed, and do not contain explosives. Additional information relative to the contents of the two bombs is provided in Table 1.

TABLE 1. CONTENTS OF AN-M79 CHEMICAL AGENT BOMBS

Bomb No.	Weight of HCN (lb)	Volume of HCN (gal)	Purity of HCN (percent)
1	175	29.7	95.7
2	106	18.0	98.8

3. Hydrogen cyanide is a commercial chemical which is produced in the United States at a rate of about 300 million pounds per year. It is used commercially in the formulation of organic chemicals and in metal plating/treatment operations. The hydrogen cyanide in the two bombs is identical to the commercial grade chemical with the exception that it has been stabilized by the addition of small amounts of sulfur dioxide and phosphoric acid. It is a clear liquid with a bitter almond odor and has the following characteristics:

a. Molecular weight: 27.03

b. Vapor density (air = 1.0): 0.947

c. Liquid Density at 68°F: 0.69 gm/ml

d. Freezing Point: 8.2°F

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* Military designation for hydrogen cyanide is "AC."

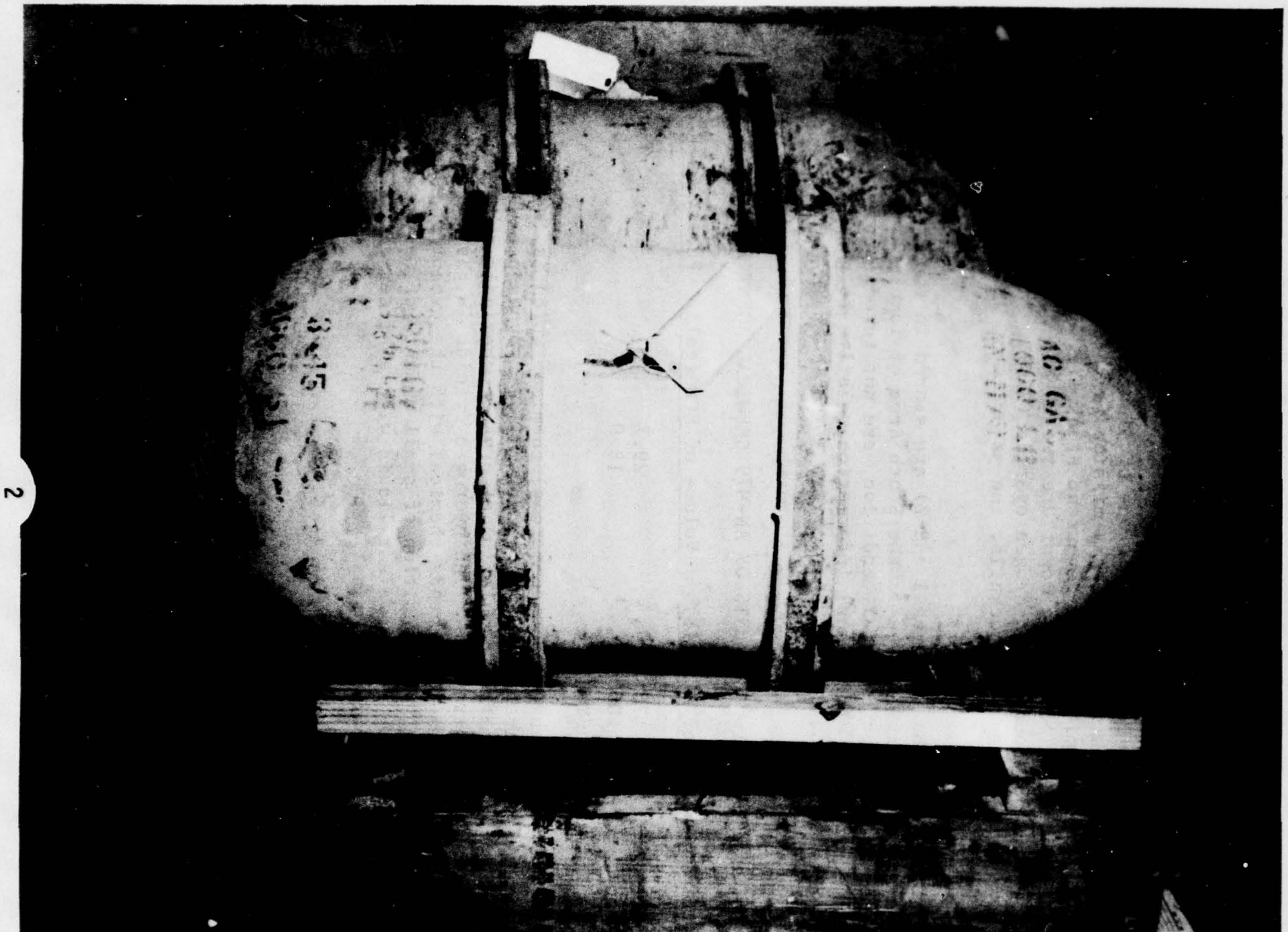


FIGURE 1. AN-M79 BOMBS IN STORAGE

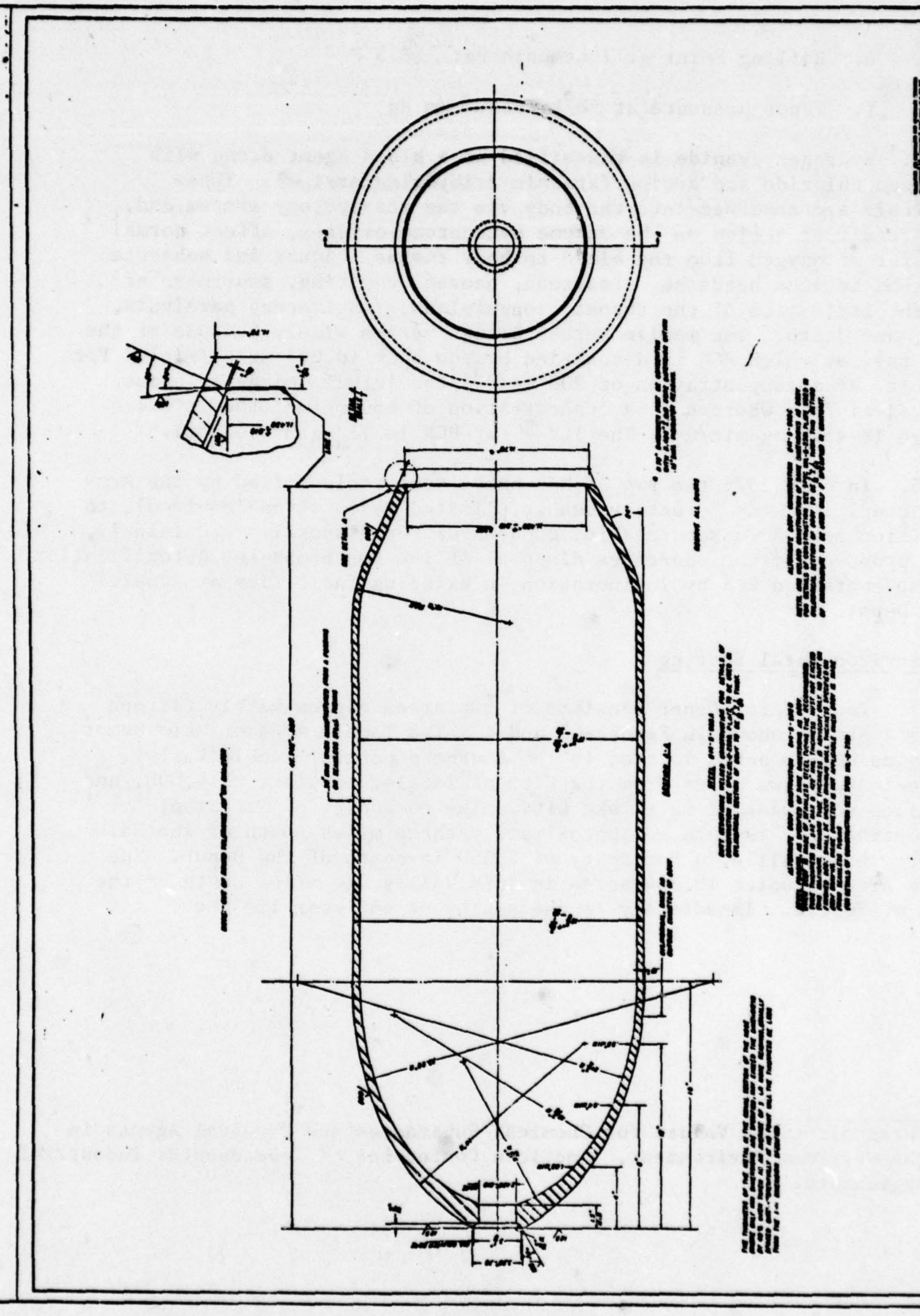


FIGURE 2. DRAWING OF AN-M79 BOMB

e. Boiling Point at 1 atmosphere: 78.3^{o}F

f. Vapor pressure at 68^{o}F: 620.4 mm Hg

4. Hydrogen cyanide is classified as a blood agent along with cyanogen chloride and arsine (arsenic trihydride arsine). These chemicals are absorbed into the body via the respiratory system and, as a result of action on the enzyme cytochrome-oxidase, affect normal transfer of oxygen from the blood to body tissue. Acute and subacute symptoms include headache, lassitude, nausea, vomiting, shortness of breath, irritation of the throat, convulsions, respiratory paralysis, coma, and death. The median lethal dosage varies widely because of the high rate at which HCN is detoxified by the body (0.017 mg/kg/min). For example, at a concentration of 200 mg/m^3, the lethal dosage is about 2000 mg-min/m^3, whereas at a concentration of 150 mg/m^3, the lethal dosage is 4500 mg-min/m^3. The TLV ® for HCN is 11 mg/m^3(10 ppm).*

5. In July 1976 the two AN-M79 bombs were reclassified by the Army from condition Code E (unserviceable, limited restoration required), to condition code H (unserviceable, condemned) for disposal. Accordingly, this proposed action addresses disposal of the two bombs and detoxification of the contained HCN by incineration in existing facilities at Tooele Army Depot.

B. <u>Environmental Setting</u>

1. Tooele Army Depot consists of two areas approximately fifteen miles apart as shown in Figures 3 and 4. The Tooele Area or Main Depot occupies 24,728 acres located in the southern part of Tooele Valley, approximately two miles from the City of Tooele, population 14,000, and 29 miles southwest of Salt Lake City. The community of Stockton, population 350, is located approximately three miles south of the Main Depot. Grantsville, a community of 2,300 is north of the Depot. The South Area occupies 19,364 acres in Rush Valley, 16 miles south of the City of Tooele. Immediately to the southwest and west lie the

* Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment, "American Conference of Governmental Industrial Hygienists.

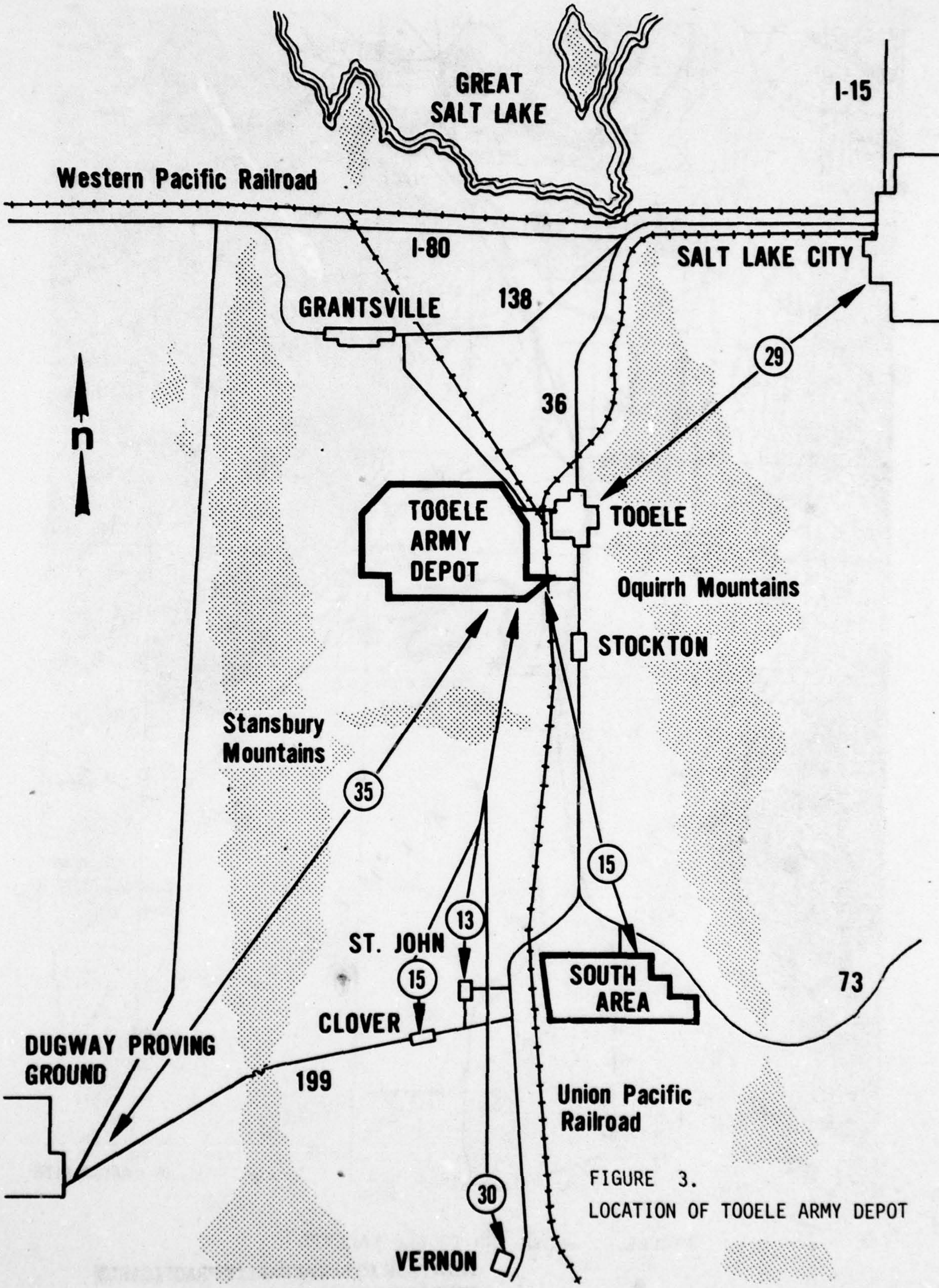


FIGURE 3.
LOCATION OF TOOELE ARMY DEPOT

FIGURE 4. RUSH AND TOOELE VALLEYS

communities of Vernon, Clover, and St. John. The community of Lehi is located 43 miles east of the South Area and has a population of approximately 4,400.

2. The Tooele and Rush Valleys are bounded on the east by the Oquirrh Mountains and on the west by the Stansbury and Onaqui Mountains. The average elevation of the Tooele and Rush Valleys are 4,920 feet and 5,300 feet, respectively. The two valleys are separated by a large natural dike-like formation (Stockton Bar) located approximately two miles south of the Main Depot area. The Tooele Valley terminates approximately fifteen miles north of the Depot in the Great Salt Lake. There is a general lack of organic soil throughout the area, and practically all of the surface materials come from various derivative forms of the apparent mountain rock. The soil in the South Area consists of mixed clay and sand. The surrounding area is classified by texture, slope, gradient, and topographic formations. It is composed of several broad terrain types and surfaces which include mountains, hills, and alluvial slopes.

a. The mountains that frame Rush Valley are folded and faulted blocks of sedimentary, metamorphic, and igneous rocks. The diverse topographic expression in the mountains generally reflects the complex internal structure of the blocks, but the present topographic relief is largely the result of movement along fault systems which as a whole trend northward. The mountains are separated by wide valleys which are partially filled with alluvial materials. The general orientation of most of the mountain ranges is north-south. They vary in size from relatively small masses to extensive ranges whose crests are aligned for several miles. General peak elevations in the area range from 5,000 to 8,000 feet above sea level. The mountains have a variety of topographic forms, ranging from steep rugged masses to well-rounded hills. Most crest lines are uniform and smooth, but in some cases, differential erosion on tilted strata has produced sharp ridges with craggy pinnacles. Most mountain slopes are covered with rock rubble resulting from weathering by water, wind, and frost. The slopes are moderately steep with average gradients of 17 to 46 percent. These gradients are emphasized by the abrupt meeting of the mountain slope with the alluvial deposits on the valley floor. The mountain streams are perennial or intermittent by nature, flow in deep, V-shaped ravines, and are swelled by rare cloudbursts and springtime runoff. The stream beds are strewn with cobblestones and boulders and are separated by sharp ridges.

b. During the course of time some mountains have been reduced to hills by the forces of erosion. The surface materials consist of coarse gravel and scattered cobblestones, two to 10 inches in diameter. Only an occasional badly-weathered rock outcrop denotes the existence of the former rock mass. The hills are gently rounded and considerably lower than the mountains with elevations ranging from 50 to 300 feet above the hill bases. The gentle slopes ascend at an average rate of 0 to 17 percent, except in ravines and washes where gradients up to 47 percent may be found. At their bases, the hills merge with alluvial slopes.

c. Alluvial slopes are formed by debris washed down from the mountains by rain and melting snow. In general, this type of terrain exhibits a long, gentle, relatively smooth slope from its base to the foot of the mountains. The portion of the slope immediately adjacent to the mountains usually consists of a band of coarse gravel some 200 to 500 yards in width. Occasionally, the zone of coarse gravel has been cut by many v-shaped, draining channels and presents a firm, well-drained surface. Merging with and, in many cases, burying the coarse gravel is the fine silty clay material which makes up the greater part of the alluvial slope surface. In some places, this zone of fine material extends up to the base of the mountains with little or no intervening zone of gravel. Alluvial slopes have between two and nine percent gradients with the steepest slopes near the mountains. The degree of the slopes becomes progressively less away from the mountains until it becomes imperceptible where the alluvial slopes merge with the silty clay flats. Small hummocks of northern desert shrub of five to 12 inches in height are numerous and closely spaced on the slope area; however, the vegetation is appreciably denser and taller than that found on the silty clay flats.

3. Rush Valley is a part of the great basin and is in the area of internal drainage that once was occupied by Lake Bonneville. The drainage basin of the valley is about 50 miles long (north-south orientation), but the valley itself is only about 30 miles long and, at its maximum width, is about 17 miles. The northern and central interior of Rush Valley was shaped during Pleistocene time when the valley was occupied by a shallow, sheltered arm of Lake Bonneville. The ancient shoreline of this lake approximates the present elevation contour of 5,200 feet. Below this level, alluvial material was formed into lacustrine features, most of which are low and weakly expressed. The only prominent example is Stockton Bar, located at the gap that formed the inlet to this arm of Lake Bonneville. This gap apparently drained Rush Valley in pre-Lake Bonneville time, but now the bar closes the drainage basin and no surface stream flow leaves it. On the west side of the valley, most of the drainage is well defined from the mountains to the lake, but to the southeast the upland stream channels end at the string of playas.

Although the playas are connected and slope toward Faust Creek, it is probable that the playas discharge water to the creek only when they receive large amounts of runoff. The playas, by their nature, are wide, long, flat areas which can dissipate large amounts of runoff water (as from a cloud burst). Because of the dissipative capacity of these playas, the potential for flooding in the South Area, due to excessive rainfall in the valley, is low. The South Area, receives an annual precipitation of 10 inches.

4. Ground water in Rush Valley is received entirely from snowmelt and rainfall within the drainage basin, mostly above altitudes of 5,500-6,000 feet. The quantity of precipitation at these altitudes generally exceeds the immediate losses from evapotranspiration, so that some water infiltrates the consolidated rocks in the mountains and some collects in streams that discharge onto the adjoining alluvial fans and aprons. Of the stream water that reaches the fans, much is lost to evapotranspiration before and after infiltration, some adds to the soil moisture, and part percolates to the water table. The average annual rate of recharge from precipitation on lands below 5,500-6,000 feet is small, because the amount of precipitation is generally small and most of the moisture is held by the soil structure and subsequently discharged by evapotranspiration. The estimate of the average annual ground water recharge to Rush Valley is only about 34,000 acre-feet of the estimated 550,000 acre-feet of precipitation that falls on the drainable basin. In the central part of the valley, ground water generally occurs under unconfined conditions in a veneer of younger alluvium that overlies the older fine-grained unconsolidated rocks. The deep, fine-grained, unconsolidated rocks yield little water to wells but contain some water under artesian pressure. The water table on the west central side of the valley slopes steeply eastward, indicating that the older unconsolidated rocks control the depth to water along the western slope of the valley by preventing downward percolation from the veneer of younger surficial rocks. On the east central side of the valley, the alluvial fan below the mouth of Ophir Canyon contains unconfined ground water. Confined (artesian) conditions are probable in the lower slopes of the fan and in the fine-grained aquifer that are beneath the valley lowlands. Water levels in and near Faust Creek are shallow, but the depth to water increases eastward. The east edge of the valley from Five Mile Pass to Twelve Mile Pass apparently is a discharge area where ground water drains from the fine-grained aquifers into limestone of paleozoic age. A ground water flow divide crosses the central part of the valley in a northeasterly-southwesterly direction. Both north and south of the ground water divide beneath the valley lowlands, the slope of the ground water table is very gentle. Although water is undoubtedly moving, the quantity of water is small because the aquifers have low permeability.

For example, it is estimated that approximately 5,000 acre-feet per year of ground water is discharged from the valley in the vicinity of Five Mile-Twelve Mile Pass. The discharge area is 15 miles wide, and the saturated thickness of the aquifer is 400 feet. The flow velocity computed from these data indicates a ground water movement of approximately seven feet per year.

5. Past measured concentrations of dissolved solids in water sampled from wells and springs in the valley ranged from 238 to 2,180 PPM. Most of the water, however, contained less than 1,000 PPM of dissolved solids. The principal constituents of most water in the valley were calcium and bicarbonate, but magnesium sodium and chloride predominated in some waters. In general, most of the water used for irrigation in Rush Valley is generally of suitable chemical quality for agricultural use; however much of the water contains one or more constituents in concentrations that exceed the maximum limits for drinking water.

6. The vegetation of the Rush Valley area has a generally uniform aspect, with only three major plant types represented. Although there is a variety of species present, their general size, color, and aggregate appearance are remarkably similar. The types of formations that have been distinguished are Juniper Woodland, Northern Desert Shrub, and Salt Desert Shrub.

7. Much of what is known about the mammalian life has been compiled from studies of surrounding and adjacent areas and from ecological surveys conducted in the South Area from 1973-1975. Table 2 presents a list of mammals which have actually been observed.

8. The sparseness of nesting sites limits the number of resident species of birds, but other factors such as open ground and rodent habitat provide excellent conditions for both resident and seasonal predatory species. Table 3 presents a list of avian species which have actually been observed.

TABLE 2

MAMMALS OF TOOELE ARMY DEPOT SOUTH AREA

Species Name	Common Name
Nycteris cinereus	Hoary Bat
Lepus californicus	Black-Tailed Jackrabbit
S. audubonii	Desert Cottontail
Ammospermophilus leucurus	Antelope Ground Squirrel
Eutamias minimus	Least Chipmunk
P. formdsus	Long-Tailed Pocket Mouse
Dipodomys ordii	Ord's Kangaroo Rat
P. maniculatus	Deer Mouse
Onychomys leucogaster	Northern Grasshopper Mouse
M. montanus	Mountain Vole
Erthizon dorsatum	Porcupine
Canis latrans	Coyote
Vulpes macrotis	Kit Fox
M. frenata	Long-Tailed Weasel
Taxidea taxus	Badger
Mephitis mephitis	Striped Skunk

TABLE 3
AVIAN SPECIES AT TOOELE ARMY DEPOT

Species Name	Common Name
Aguila chrysaetos	Golden Eagle
Circus cyaneus	Marsh Hawk
Buteo lagopus	Rough-Legged Hawk
Haliaeetus leucocephalus	Bald Eagle
Cathartes aura	Turkey Vulture
Accipiter striatus	Sharp-Skinned Hawk
Buteo swainsoni	Swainson's Hawk
B. jamaicensis	Ted-Tailed Hawk
B. regalis	Ferruginous Hawk
Falco sparverius	Sparrow Hawk
F. mexicanus	Prairie Falcon
Zenaidura macroura	Mourning Dove
Chordeiles minor	Common Nighthawk
Hirundo rustica	Barn Swallow
Turdus migratorius	Robin
Pooecetes gramineus	Vesper Sparrow
Phasianus colchicus	Ring-Necked Pheasant
Bubo virginianus	Great Horned Owl
Speotyto cunicularia	Burrowing Owl
Eremophila alpestris	Horned Lark
Aphelocoma coerulescens	Scrub Jay
Corvus corax	Common Raven
Cymnorhinus cyancocephala	Pinon Jay
Lanius ludovicianus	Loggerhead Shrike
Sturnus vulgaris	Starling
Passer domesticns	House Sparrow
Sturnella neglecta	Western Meadowlark

C. Description of Operations.

1. Movement.

a. The HCN-filled bombs are stored in Toxic Storage Area 10 and will be transported over an all-weather road to the disposal site which is in the western part of Area 11 (Figure 5).

b. Each bomb will be inspected prior to movement to assure that it is not leaking. The leak testing will be done with the M18A2 Chemical Agent Detector Kit which has a detection threshold of eight mg/m^3.

c. When it has been determined that a bomb is safe for movement, it will be placed in an inclosed vehicle. The bomb, secured to a pallet with 1¼ inch banding, will be held in position within the vehicle using dunnage-free blocking equipment.

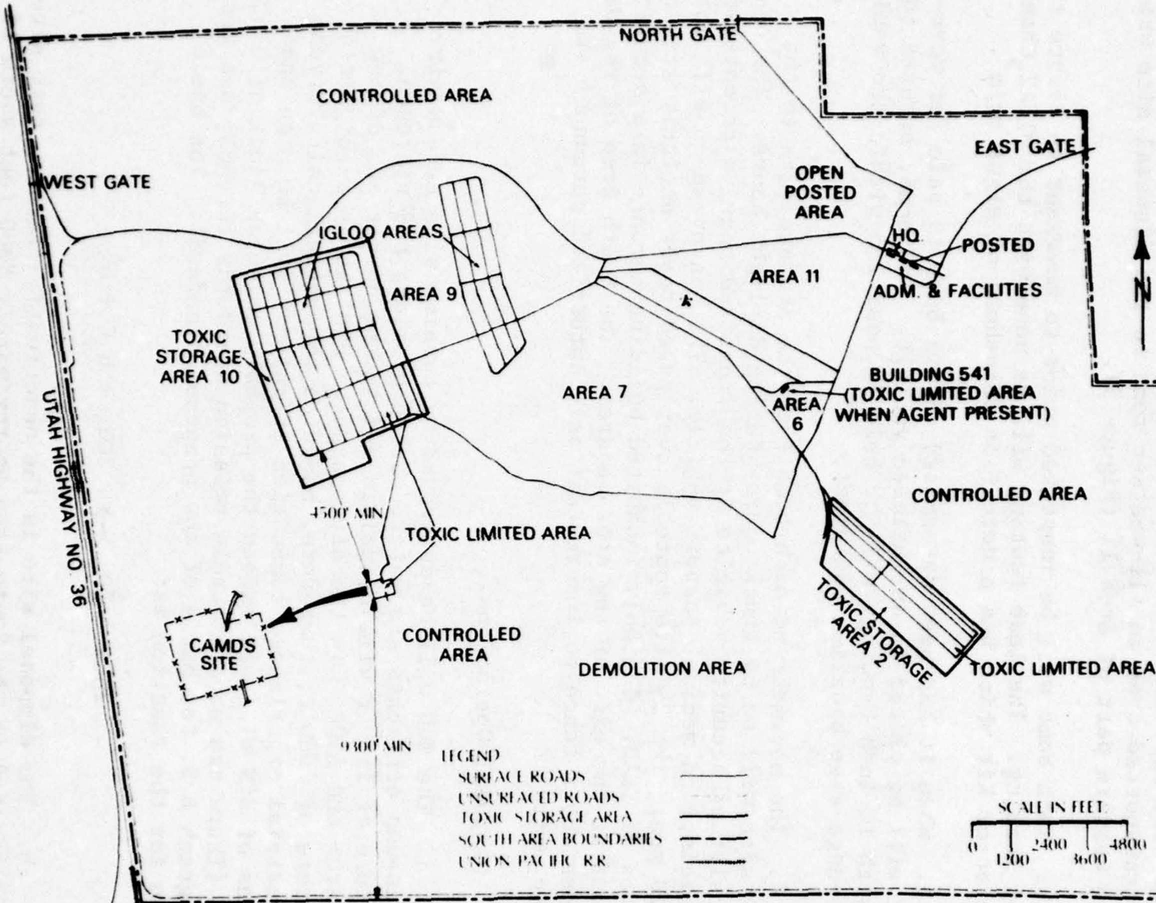
d. The movement of each bomb from the storage site to the disposal site will be by truck convoy during daylight hours. The convoy will consist of security vehicles at the front and rear, a decontamination vehicle, and medical support vehicle. The convoy speed will not exceed 20 mph. The 2½ mile route is over paved roads entirely within the South Area of TEAD. The only inhabited building enroute is a security guard post at the exit of the storage area. The South Area of the Depot is enclosed by a fence to insure that only authorized personnel are permitted entry.

2. Disposal Operations.

a. The HCN will be destroyed by burning with excess air. The basic gaseous effluents are water, carbon dioxide, and nitrogen. A temperature of 1100°F will be maintained in the burner end of the incinerator and 1500°F in the afterburner. HCN has an autoignition temperature of 1000°F; therefore, based on theoretical calculations and industrial experience, combustion efficiency will be high and emissions of HCN will not exceed the proposed emission limit of 0.028 lb/min. (There are no applicable emission standards for HCN; see Section 3, paragraph B.3. for basis of the proposed standard). The basic equation for the reaction is:

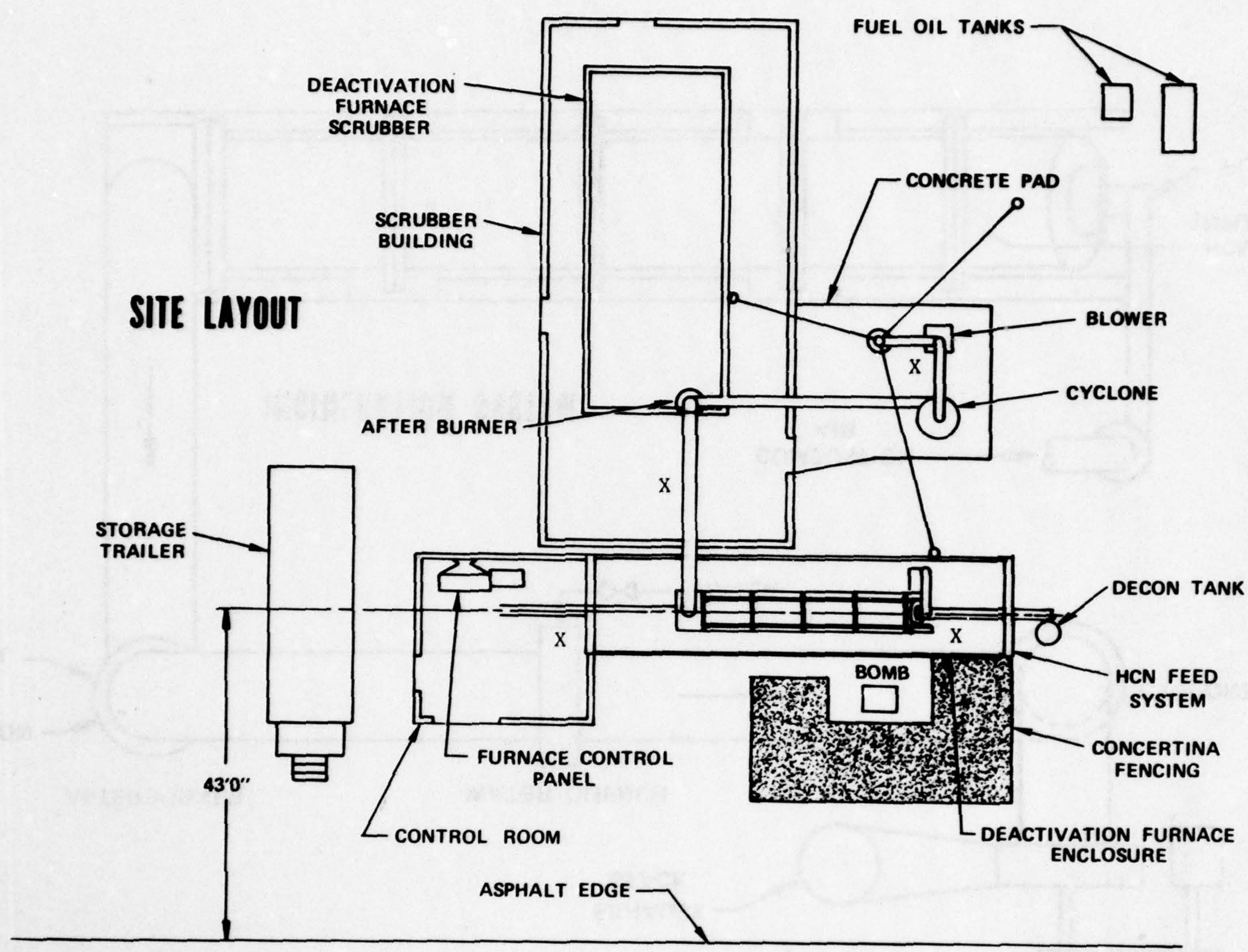
$$2HCN + \frac{5}{2}O_2 \rightarrow 2CO_2 + H_2O + N_2$$

b. The disposal site is the deactivation furnace test site which is located in the South Area approximately 8000 feet south of the closest boundary (see Figure 5). A layout of the site is provided at Figure 6. A schematic of the disposal facility is provided at Figure 7.



* HCN Disposal Site

FIGURE 5. SOUTH AREA OF TOOELE ARMY DEPOT



X - Area monitoring locations

FIGURE 6.

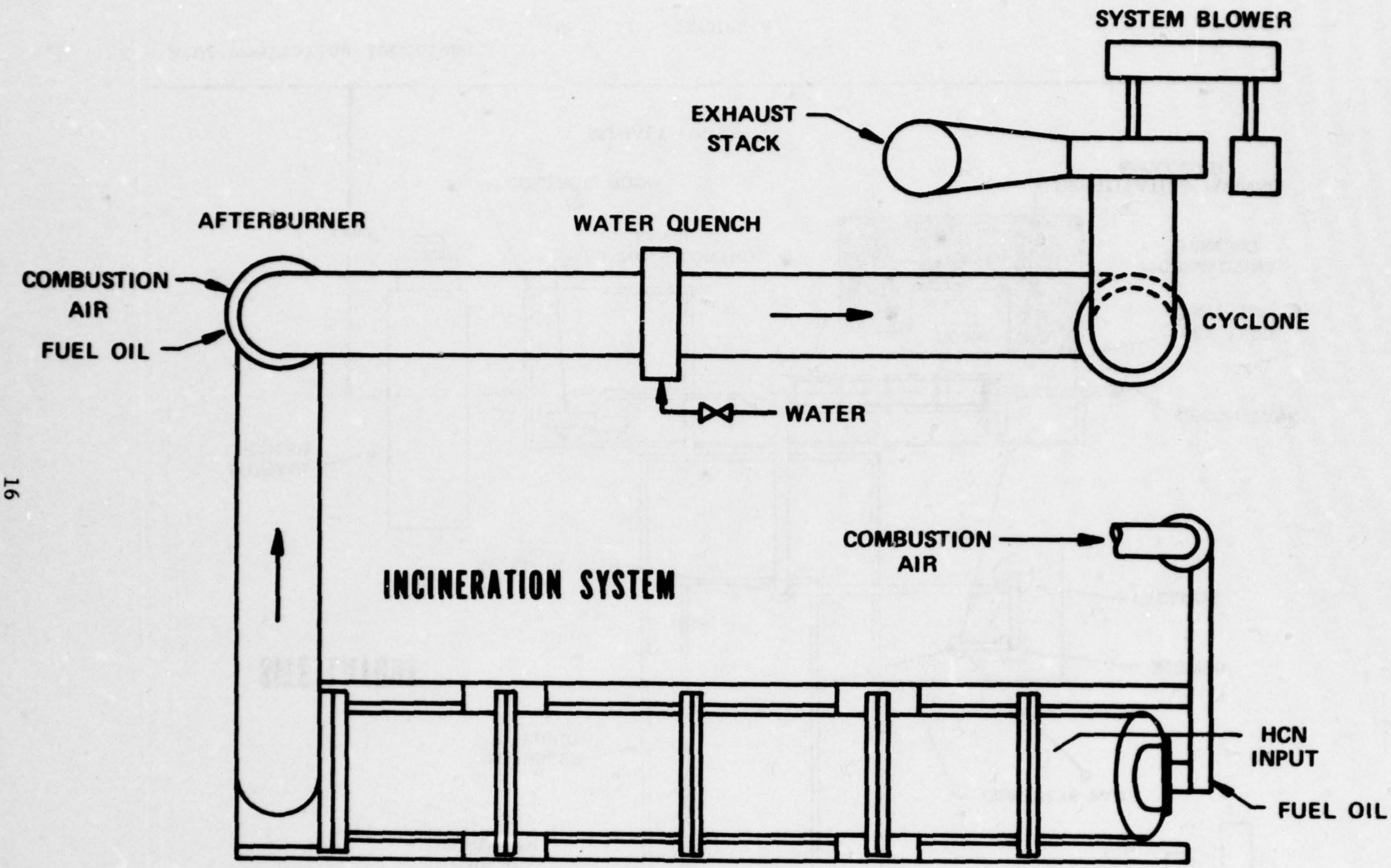

SYSTEM BLOWER
EXHAUST STACK
AFTERBURNER
WATER QUENCH
COMBUSTION AIR
FUEL OIL
CYCLONE
WATER
COMBUSTION AIR
INCINERATION SYSTEM
HCN INPUT
FUEL OIL

FIGURE 7.

c. The primary component of the system is the APE 1236 deactivation furnace. The furnace consists of a cast steel revolving retort, a fuel oil burner, combustion air blower, exhaust stack, and control panels. (The system also includes feed and discharge assemblies and conveyors for feeding obsolete munition and recovering metals which will not be used for the HCN operation.) The furnace will be operated with Number 2 fuel oil. Flame temperature will be maintained by automatically modulating the burner as the need is indicated by a temperature recorder/controller in the control panel. Two thermocouples will continuously record temperatures: one immediately above the flame which provides a reference temperature to the temperature recorder/controller, and the other at the base of the exhaust stack. Effluent gases from the furnace will pass through a duct to an oil-fired afterburner which will be operated at a nominal temperature of $1500^{\circ}F$. The outlet temperature of the afterburner will be controlled by modulating the fuel oil firing rates. Effluent gases from the afterburner will pass through a fresh water quench for cooling and a cyclone collector prior to exiting through a 50-foot stack.

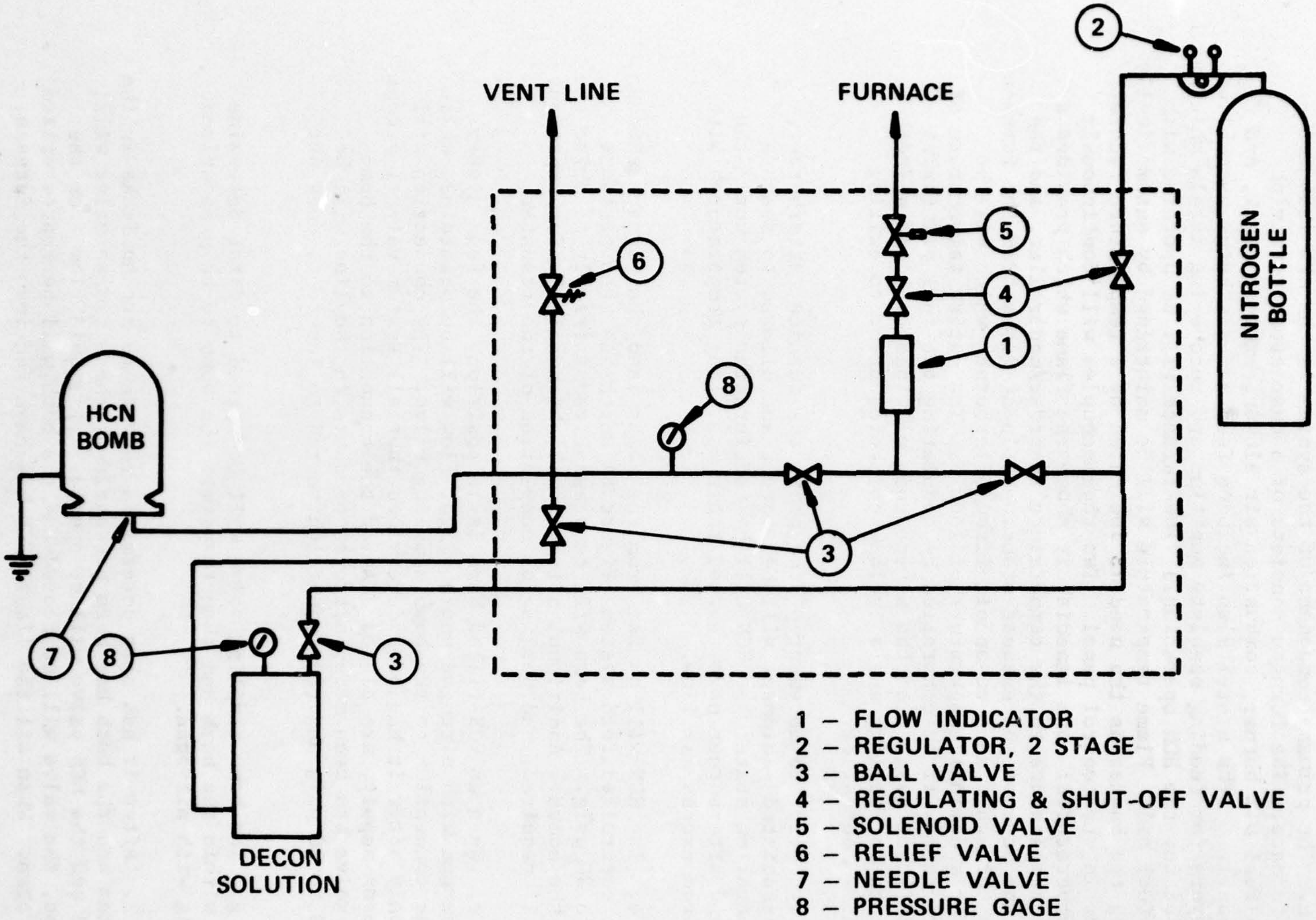
d. Prior to movement of the bomb, the furnace, afterburner, and all associated equipment will be started and allowed to reach a steady operating state. No HCN will be fed into the system until the furnace and afterburner have reached their operating temperatures with the required excess air flow.

e. The HCN will be fed from the bombs into the furnace through a closed, controlled feed system (Figure 8) which has been pressure checked to 30 psig. The bomb will be pressurized initially to drive the HCN from the bombs. Additional nitrogen will be available for repressurization, if required, and purging on completion of the transfer.

f. When an HCN-filled bomb is in position, the feed system will be purged with nitrogen and a slight flow will be maintained while making the connection to the bomb sampling valve. The connection will be made only after it has been determined that all system valves, except the nitrogen supply, are closed. After the connection to the bomb sampling valve has been made, nitrogen pressure in the line will be increased to 20 psig and the connection tested to insure it does not leak.

g. The bomb sampling valve will be opened to first determine pressure within the bomb and then to permit the bomb to be pressurized to 20 psig with nitrogen.

h. After it has been determined that there are no leaks in the feed system and the bomb has been pressurized, the nitrogen valve will be closed and the HCN valve will be opened. If liquid flow from the bomb stops, the valve will be closed and the bomb will be repressurized with nitrogen. When all the liquid HCN has been fed into the furnace,



FEED CONTROL SYSTEM

FIGURE 8.

the bomb will be purged with nitrogen, the resultant gaseous mixture will be fed into the incinerator, the bomb sampling valve will be closed, and the bomb will be disconnected from the feed system.

i. Critical process parameters (temperatures and pressure) will be monitored during the disposal operation. The HCN feed will be terminated if the temperature drops below $1400^{o}F$ in the afterburner or exceeds safe operating conditions for the system, emissions or area HCN concentrations exceed acceptable levels, or other adverse conditions develop. The small quantity of HCN already in the system following termination of the HCN feed would be reduced to acceptable levels by the heat retained in the system even in the event of flame-out.

3. Decontamination and Cleanup.

a. After a bomb has been disconnected from the feed system, it will be repositioned with the sampling valve at the top and filled with a caustic/bleach decontaminating solution to neutralize any remaining HCN ($2HCN + 5NaOCl + 4NaOH \rightarrow N_2 + 2Na_2CO_3 + 5NaCl + 3H_2O$). The bombs will be periodically vented into the furnace during filling with the decontaminating solution to insure destruction of HCN vapor. After each bomb has been filled with the decontaminating solution, it will be stored for 24 hours with the valve open to vent any non-hazardous gaseous reactants (elemental nitrogen, water vapor and CO_2). The solution will then be checked with a specific ion electrode to verify the absence of HCN and transferred to the CAMDS facility where it will be drum dried. The resultant (non-toxic) salt (a mixture of sodium carbonate and sodium chloride) will be placed in a 55-gallon drum(s) for eventual disposal as solid waste by burial in a sanitary landfill.

b. The chemically decontaminated bomb casings will be transferred to the Demolition Range in the Main Area of the Depot where they will be severed (demilitarized) with a linear shape charge. The severed casings will then be thermally decontaminated by putting them in an existing flashing furnace, operated at $1500^{o}F$, for 30 minutes. The bomb casings will be disposed of as scrap metal after thermal decontamination.

c. The feed system will also be chemically and thermally decontaminated prior to disposal as scrap metal.

4. Safety and Support Functions.

a. Work area HCN monitors will be located in strategic locations (Figure 6) to insure maintenance of a safe working environment in areas where the wearing of protective clothing will not be required. A monitoring station will also be located downwind of the disposal site. The monitors will be capable of detecting 0.05 mg/m^3 with a response time of one hour. In addition, M8 alarms with a detection capability of 0.1 mg/m^3 and a response time of one minute will be positioned in the work area.

b. Threshold Limit Value® for HCN is 11 mg/m^3. Area monitor detector results at a value of 16 mg/m^3 will cause all operations to be terminated. Area monitor detector results at a value of 11 mg/m^3 will cause all personnel to don protective masks and take action to identify and eliminate the source of high readings.

c. Deactivation furnace exhaust gases will be monitored for HCN downstream from the furnace retort. Stack emissions of 0.015 lb/min (150 mg/m^3) will require action to limit emissions. A concentration of 0.028 lb/min (275 mg/m^3) will require shutdown of the HCN feed.

d. An emergency vehicle, manned by trained medical personnel, will be immediately available to transport casualties, if required. This vehicle is equipped with a communications system and the required medical supplies to provide first-aid treatment for HCN casualties. The medical dispensary in the South Area of TEAD is 2¼ miles from the disposal site. It is manned by Emergency Medical Technicians (EMT), specially equipped and trained to receive, decontaminate, diagnose agent symptoms and provide emergency treatment. These technicians will be onsite when the disposal operation is underway. In addition to the EMTs, the emergency vehicle, communications and medical supplies, a physician will be standing-by at the North Area and rushed to the South Area, if needed. Additionally, all operating personnel will be trained in the recognition of HCN exposure symptoms and will be capable of rendering first-aid or self-aid treatment. Up-to-date toxic agent medical examinations will be required for all personnel assigned to the disposal operation.

e. Telephone services will be provided between the disposal site and the Depot's Emergency Operations Center and other depot facilities. Radio communication will be available as a backup system from the disposal site and will serve as primary communication during convoy movements. A separate radio network will be available as a backup for medical emergencies.

f. Disposal operations will be conducted only under stable weather conditions. Winds in excess of 20 mph or electrical storms will result in termination of operations.

g. All personnel involved in any aspect of the disposal operation will have protective masks immediately available. Protective clothing and respirators will be worn by personnel during initial inspection of the bombs, during hook-up to the feed system, and at other times when a credible potential exists for exposure to HCN.

h. An Officer in Charge (OIC) will be designated and will be responsible for all safety aspects of the conduct of the disposal operation. A safety representative knowledgeable in HCN safety precautions and requirements will be at the site to assist the OIC. The number of personnel at the site will be limited to the minimum considered essential for conduct of operations. Occupancy in the control room will be limited to six; entrance into the furnace barricade will be limited to three; and entrance into the afterburner building will be limited to six. No individual will be permitted alone or unobserved in any operations area.

i. The Depot Emergency Operations Center (EOC) will obtain a weather report and a forecast of wind speeds, wind direction, and temperature prior to initiating daily operations. This information will be furnished to the Depot Commander and the OIC of disposal operations. The OIC will verbally request the Commander to authorize disposal operations. If permission is granted, the Commander will be advised of the estimated completion time. The EOC will advise all operational, support, and response teams when operations are in effect (and when operations are completed). All communication nets will be tested to assure that they are operational before disposal operations commence.

SECTION 2. RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES, AND CONTROLS

The proposed action in this assessment conforms to land use plans, policies, and controls for Tooele Army Depot and is consistent with the military mission of Tooele Army Depot and Department of Defense plans relative to the disposal of chemical warfare agents and munitions. The Master Plan for Tooele County 1990, dated 1977, lists the South Area of Tooele Army Depot as a military installation with no encroachment.

SECTION 3. PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

A. General. This action should not have a significant adverse impact on the environment. It has been developed with safety and security as primary concerns, and with the specific objective of insuring that the probability of a release of the HCN agent to the environment is minimal. The following comments are directed toward air quality which is the only area where a potential for impact exists.

B. Air Quality.

1. The emissions associated with the action will be from vehicles used to transport filled and drained bombs to the process furnaces, support equipment, and from the process furnaces.

2. The emissions from vehicles, support equipment, and the decontamination furnace will be minor, limited in duration, and will not cause a distinguishable degradation of ambient air quality.

3. Because of the high potential for low level inversions in the Rush Valley, the maximum allowable emission rate was derived for a fumigation condition according to the method presented by Turner.* The resultant maximum ground level concentration was set at 0.37 mg/m^3 or 1/30th the TLV®, and a tiered emission limit was adopted so corrective action will be taken at an emission rate of 0.015 lb/min and the process shut down at the maximum allowable emission rate of 0.028 lb/min. Accordingly, HCN emissions from the furnace should not cause a significant degradation of ambient air quality or exposure of non-operationally involved personnel.

4. The probability of an accidental release of the HCN has been assessed and concluded to be extremely low.

a. The munitions have been carefully evaluated and the determination has been made that they are intact and can be safely moved with respect to integrity of the munition body.

b. The roads to be traveled during the truck convoy movements are all-weather roads, judged safe for the vehicles which will be used. The movements will be conducted only during favorable weather and road conditions with security escort, and at speeds not to exceed 20 miles per hour.

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* Turner, D. Bruce, Workbook of Atmospheric Dispersion Estimates, U. S. Department of Health, Education, and Welfare.

c. Positive safeguards, as discussed in Section 1, will be taken during connection of the bomb to the feed system and during the rest of the disposal operation to preclude accidental release of HCN.

d. Accordingly, the release of HCN during the operation is not considered to be a credible event. However, if such an event were to occur, the maximum downwind hazard distance to where there might be fatalities in one percent of an exposed, unprotected population is 1,160 feet. This hazard distance does not extend past any installation boundary (the closest installation boundary is 7600 feet away) nor does it reach areas on the installation occupied by exposed non-operational personnel.

C. Other Considerations.

1. This action will have no socioeconomic impact on Tooele Army Depot due to its limited duration and low dollar cost.

2. This action will have no impact on plant and animal life because of its limited duration and use of existing roads and facilities.

3. The cumulative effects of the proposed action and operation of the CAMDS facility have been considered to be no greater than those presented for either action.

SECTION 4. ALTERNATIVES TO THE PROPOSED ACTION.

A. Alternatives to the proposed action include:

1. Continued retention of the two hydrogen cyanide-filled bombs in storage at Tooele Army Depot.

2. Disposal of the hydrogen cyanide in another demilitarization facility.

3. Sale of the hydrogen cyanide for use as an industrial chemical.

B. No benefit would be realized by retention of the agent-filled bombs. They have no military utility; therefore, their retention would only defer disposal costs while incurring additional costs for storage, surveillance, and surety.

C. The only other demilitarization facility which could be considered for disposal of the materiel is the Chemical Agent Munitions Disposal System (CAMDS) which is also located in the South Area of Tooele Army Depot. The hydrogen cyanide could either be incinerated or chemically detoxified in the CAMDS. The latter method, chemical detoxification with bleach and caustic, would produce an estimated 23 tons of liquid waste. Additionally, the CAMDS, which would have to be modified to process the hydrogen cyanide, has a dedicated mission to demilitarize a selected quantity of other unserviceable chemical agents and munitions in the chemical stockpile over a six-year period. Therefore, use of the CAMDS was not considered a viable alternative to the use of another existing facility which is immediately available.

D. As mentioned in Section 1, hydrogen cyanide is used commercially. Therefore, sale would appear to be a feasible disposal method; however, PL 91-121, as amended by PL 91-441, requires lethal chemical agents be detoxified prior to disposal. The effort to enact legislation permitting disposal by sale does not appear warranted considering the quantity of material involved.

SECTION 5. PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The proposed action will not have any significant adverse impact on the environment, nor is it anticipated that this action will be environmentally controversial. The only credible effects will be those associated with the operation of vehicles and atmospheric emissions during the disposal operation. These effects will be minor and will not result in a quantifiable degradation of the environment.

SECTION 6. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The proposed action involves no trade-offs between short-term environmental gains at the expense of long-term productivity, or vice-versa.

SECTION 7. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

A. No cultural or historical factors will be degraded as a result of the action.

B. The action will require an estimated:

1. Fuel Oil: 2,560 gallons
2. Process Water: 4,000 gallons
3. Sodium Hydroxide: 6 pounds
4. Bleach: 140 gallons of 5.25 percent solution
5. Cost: $130,000 for development and engineering support;
$20,000 for operations and cleanup
6. Manpower: 650 man-days for development and engineering support;
130 man-days for operations and cleanup

SECTION 8. OTHER INTERESTS AND CONSIDERATIONS OF FEDERAL POLICY THAT OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

As stated in Sections 3 and 5, the proposed action will not result in any significant adverse environmental effects. Accordingly, there are no applicable interests and consideration of Federal policy involved other than the goal of effecting disposition of hazardous, obsolete military items in an environmentally safe and cost effective manner.